United States Environmental Protection Agency
Region 10

FACT SHEET

Date:
NPDES Permit Number: WA-002480-5
Public Notice Expiration Date:
Contact: Charles Bert (206) 553-0225 or
1-800-424-4372 (within Alaska, Idaho, Oregon, Washington)

The U.S. Environmental Protection Agency (EPA)
Plans To Reissue A Wastewater Discharge Permit To:

Tulalip Tribes of Washington, Inc.
Tulalip Utilities District #1
Marysville, Washington

and
The State of Washington Proposes to Certify the Permit
and Issue a Consistency Determination

EPA Proposes NPDES Permit Reissuance.
EPA proposes to reissue a *National Pollutant Discharge Elimination System* (NPDES) Permit to the Tulalip Utilities District #1. The draft permit sets conditions on the discharge--or release--of pollutants from the Tulalip Utilities District #1 Wastewater Treatment Plant to Possession Sound (Puget Sound). In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged, and places conditions on the transfer of sewage sludge for additional processing.

This Fact Sheet includes:
- Information on public comment, public hearing, and appeal procedures
- Description of the current discharge and sewage sludge management practices
- Listing of proposed effluent limitations, monitoring requirements, and other conditions
- Map and description of the discharge location
- Detailed technical material supporting the conditions in the permit

The State of Washington Proposes Certification and Consistency Determination
The Washington Department of Ecology is proposing to certify the NPDES permit under Section 401 of the Clean Water Act and conduct a review to determine consistency with the Coastal Zone Management Act and the Washington Shorelines Management Act. Preliminary comments have been incorporated into the draft permit.

Public Comment

EPA will consider all substantive comments before issuing the final permit. Those wishing to comment on the draft permit may do so in writing by the expiration date of the Public Notice. A request for public hearing must state the nature of the issues to be raised as well as the requester's name, address, and telephone number. After the Public Notice expires, and all comments have been considered, the EPA's Regional Director for the Office of Water will make a final decision regarding permit reissuance.

Persons wishing to comment on Certification or Consistency should submit written comments to the appropriate state agency on or before the expiration date of the Public Notice.

If no substantive comments are received, the tentative conditions in the draft permit will become final and the permit will become effective upon issuance. If comments are received, EPA will address the comments and issue the permit. The permit will become effective 30 days after the issuance date, unless a request for an evidentiary hearing is submitted within 30 days. If no substantive comments are received, the tentative conditions in the draft permit will become final and the permit will become effective upon issuance.

Documents are Available for Review

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting the EPA Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday (see address below). Draft permits, Fact Sheets, and other information can also be found by visiting the Region 10 website at www.epa.gov/r10earth/offices/water/npdes.htm.

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Region 10
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Seattle, Washington 98101
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Marysville Public Library
6120 Grove Street
Marysville, Washington 98270

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I. APPLICANT

Tulalip Tribes - Tulalip Utilities District #1

Facility Location and Mailing Address:
3015 Mission Beach Drive
Marysville, Washington 98210

Facility Contact: Terry Hawley, Manager Tulalip Utilities Authority

NPDES Permit Number: WA-002480-5

II. FACILITY ACTIVITY

The Tulalip Tribes Indian Reservation is located approximately 6 miles west of Marysville in Snohomish County, Washington. The reservation supports a year-round population of between 7,000 and 8,000 people, with summer time peaks of up to 10,000 people. The Tulalip Tribes own, operate, and maintain a wastewater treatment plant (WWTP) on Mission Beach Drive that treats domestic wastewater for an estimated 800 to 850 residential units in Tulalip Bay and the Tulalip Indian Tribal Complex. The map in Appendix A shows the location of the treatment plant and discharge. The facility provides secondary treatment of wastewater prior to discharging it to Possession Sound. Refer to the process flow diagram in Appendix B for a more detailed description of the wastewater treatment process. There are no industrial contributors to the wastewater collection and treatment system.

III. RECEIVING WATER

Possession Sound is located in the northern half of Puget Sound in western Washington. The Tulalip Utilities District #1 WWTP discharges its wastewater directly to Possession Sound via Outfall 001. The 12 inch outfall line extends approximately 1,700 feet from shore at a depth of 50.7 feet below the mean lower low water (MLLW). The terminus of the outfall is located at latitude 48E 02N41O and longitude 122E18N41O.

The effluent discharge to Possession Sound is a discharge to the waters of the State of Washington. Therefore, the State of Washington water quality standards were applied to this permit. Under the state's water quality standards, water bodies are classified into one of five different classes. Each classification protects the water for specific uses. Classifications are found in the *Water Quality Standards for Surface Waters of the State of Washington*, WAC 173-201A-140 Specific Classifications - Marine Water. Possession Sound between latitudes 47° 57' N and 48° 27' 20" N is classified as a Class A water body.

Class A designation under the State of Washington water quality standards protects this water body for the following uses: water supply (domestic, industrial, agricultural); stock

watering; fish and shellfish(salmonid and other fish migration, rearing, spawning, and harvesting; clam, oyster, and mussel rearing, spawning, and harvesting; crustacean and other shell fish rearing, spawning, and harvesting); wildlife habitat; recreation (primary contact recreation, sport fishing, and boating); and commerce and navigation. The quality of the water in Possession Sound meets the class designation for this water body.

The state's water quality standards also include numeric or narrative water quality criteria deemed necessary to support the use classification of each water body. The water quality criteria for Possession Sound are contained in WAC 173-201A-030(2).

IV. FACILITY BACKGROUND

The Tulalip Tribes WWTP has been in operation since October 1975. An NPDES permit was issued to the Tulalip Tribes WWTP on April 26, 1983. The permit was modified on April 22, 1985 and expired April 25, 1988. In accordance with 40 CFR §122.6, the expired permit was administratively extended by EPA and allowed to remain in effect until a new permit is issued.

The Tulalip Utilities District #1 submitted an updated permit application which was received by EPA on December 12, 1996. The application indicated the WWTP had been upgraded by installing a second oxidation ditch and two additional secondary clarifiers capable of meeting secondary treatment standards with a design capacity of 616,000 gallons per day (gpd). The previous plant had a design capacity of 308,000 gpd. The new oxidation ditch and secondary clarifiers were brought into service in June of 1997 and the original oxidation ditch and secondary clarifiers were removed from service for maintenance and renovation. Because the original units have not been returned to service, the WWTP is functioning at the lower design capacity. The draft permit, therefore, contains interim effluent limits based on a flow of 308,000 gpd and final effluent limitations based on the design flow of 616,000 gpd. Final effluent conditions in the draft permit will become effective when renovations are completed and the original oxidation ditch and secondary clarifiers are returned to service, but no later than one year after the effective date of the permit.

V. DISCHARGE LIMITATIONS

A. General Approach

EPA followed the Clean Water Act, state and federal regulations, and EPA's 1991 *Technical Support Document for Water Quality-Based Toxics Control* (TSD) to develop the proposed effluent limits. Appendix C provides the technical basis for the effluent limits outlined in this section.

In general, the Clean Water Act requires that the effluent limits for a particular pollutant be the more stringent of either the *technology-based* or *water quality-based* effluent limits. Technology-based limits are based on the level of treatment that is achievable using available technology. Water quality-based limits are required for discharges that have the reasonable potential to cause or contribute to an exceedance of the state water quality standards.

EPA must also consider the antidegradation policy contained in a state's water quality standards when establishing effluent limits. This policy is designed to maintain a level of quality necessary to protect the existing uses of a waterbody and protect actual water quality in cases where water quality exceeds levels necessary to support fish, shellfish, wildlife, and recreation in and on the water.

B. Effluent Limits

The draft permit establishes both technology-based and water quality-based limits. Technology-based limits have been included for five-day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), and percent removal of BOD_5 and TSS. Limits for fecal coliform (FC) bacteria are based on those established in the previous permit and the anti-backsliding provisions of the Clean Water Act. Water quality-based limits have been included for total residual chlorine and pH. Table V-1 summarizes the interim limits included in the draft permit, and Table V-2 summarizes the final limits included in the draft permit.

Table V-1. Tulalip Utilities District #1 WWTP Interim Effluent Limitations

Parameter	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Percent Removal[1]
Flow	308,000 gpd	--	--	--
BOD_5	30 mg/l	45 mg/l	--	85 %
	77 lbs/day	116 lbs/day	--	
TSS	30 mg/l	45 mg/l	--	85 %
	77 lbs/day	116 lbs/day	--	
Fecal Coliform[2]	200 FC/100 ml	400 FC/100 ml	--	--
Chlorine, Total Residual	0.31 mg/l	--	0.87 mg/l	--
	0.80 lb/day	--	2.23 lb/day	--
pH	6.0 - 9.0			

Parameter	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Percent Removal[1]

1. 85 percent removal requirements for BOD_5 and TSS: For any month, the monthly average effluent concentration shall not exceed 15 percent of the monthly average influent concentration.
2. The average monthly fecal coliform count must not exceed a geometric mean of 200 col./100 ml based on a minimum of five (5) samples taken over a thirty day period. The average weekly fecal coliform count must not exceed a geometric mean of 400 col./100 ml in more than ten (10) percent of the total samples taken over a thirty day period.

Table V-2. Tulalip Utilities District #1 WWTP Final Effluent Limitations

Parameter	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Percent Removal[1]
Flow	616,000 gpd	--	--	--
BOD_5	30 mg/l	45 mg/l	--	85 %
	154 lbs/day	231 lbs/day	--	
TSS	30 mg/l	45 mg/l	--	85 %
	154 lbs/day	231 lbs/day	--	
Fecal Coliform[2]	200 FC/100 ml	400 FC/100 ml	--	--
Chlorine, Total Residual[3]	0.006 mg/l	--	0.017 mg/l	--
	0.031 lb/day	--	0.087 lb/day	--
pH	6.0 - 9.0			

1. 85 percent removal requirements for BOD_5 and TSS: For any month, the monthly average effluent concentration shall not exceed 15 percent of the monthly average influent concentration.
2. The average monthly fecal coliform count must not exceed a geometric mean of 200 col./100 ml based on a minimum of five (5) samples taken over a thirty day period. The average weekly fecal coliform count must not exceed a geometric mean of 400 col./100 ml in more than ten (10) percent of the total samples taken over a thirty day period.
3. The permittee will be in compliance with the total residual chlorine effluent limits provided the calculated monthly average total chlorine residual is at or below the analytical method *minimum level* of 100 µg/l (0.10 mg/l).

The draft permit requires that discharges be free from floating, suspended, or submerged matter in concentrations that cause or may cause a nuisance. It also prohibits discharges of waste streams that are not part of the normal operation of the facility as reported in the permit application. Refer to Appendix C for a complete discussion on the basis used to determine effluent requirements in the draft permit.

VI. MONITORING REQUIREMENTS

A. Effluent Monitoring

The Clean Water Act requires that monitoring be included in permits to determine compliance with effluent limitations. Monitoring may also be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting monitoring and reporting the results to EPA in Discharge Monitoring Reports (DMRs). Tables VI-1 contains the proposed effluent monitoring requirements based on the minimum sampling necessary to adequately monitor facility performance.

TABLE VI-1. Effluent Monitoring Requirements for Outfall 001

Parameter	Minimum Sample Frequency	Sample Type
Flow, mgd	Continuous	Recording
BOD_5, mg/l[1]	2/Week	24-hour Composite[2]
TSS, mg/l[1]	2/Week	24-hour Composite[2]
Dissolved Oxygen, mg/l	2/Week	Grab
Fecal Coliform Bacteria, colonies/100 ml	5/Week	Grab
Total Residual Chlorine, mg/l	Daily	Grab
Temperature, °C	Daily	Grab
pH, standard units	Daily	Grab

Notes: 1. Percent Removal Monitoring: The percent BOD_5 and TSS removal shall be reported on each monthly DMR form.
2. 24-hour composite samples shall consist of not fewer than eight discrete flow-proportional aliquots collected over a twenty-four hour period. Each aliquot shall be a grab sample of not less than 100 ml and shall be collected and stored in accordance with procedures prescribed in *Standard Methods for the Examination of Water and Wastewater,* 18th Edition.

B. Special Effluent Monitoring

The permittee will be required to conduct special effluent monitoring. Monitoring results shall be submitted to EPA along with the application for permit re-issuance. Table VI-2 contains the proposed special effluent monitoring requirements. Monitoring for three metals will be conducted semi-annually, once in winter and once in summer, for the life of the permit. Data from the monitoring will be used to determine the need for chemical-specific effluent limits during the next permit cycle.

Table VI-2. Special Effluent Monitoring

Parameter	Minimum Sample Frequency	Sample Type
Copper	2/year	24-hr. Composite
Mercury	2/year	24-hr. Composite
Silver	2/year	24-hr. Composite

C. Non-routine Discharges

The requirement in the federal regulations regarding representative sampling (40 CFR § 122.41 (j)) has been expanded and specifically requires sampling whenever a bypass, spill, or non-routine discharge of pollutants occurs, if the discharge may reasonably be expected to cause or contribute to a violation of an effluent limit under the permit. This provision is included in the draft permit because routine monitoring could easily miss permit violations and/or water quality standards exceedances that could result from bypasses, spills, or non-routine discharges. This requirement directs the permittee to conduct additional, targeted monitoring to quantify the effects of these occurrences on the final effluent discharge.

D. Minimum Detection Levels

The *method detection limit* is defined as the minimum concentration of an analyte that can be measured and reported with 99% confidence that the concentration is greater than zero. However, in order to compensate for uncertainty above the method detection limit, EPA has developed what is referred to as the *minimum level* (ML). The ML is defined as the lowest concentration of a particular pollutant that gives recognizable signals and an acceptable calibration point. In cases where an effluent limit has been established that is below the ML, the ML is generally used as a measure of compliance that can be reported with certainty as measured. Appendix C includes a discussion of minimum detection levels with regard to total residual chlorine limits in the draft permit.

VII. OTHER PERMIT CONDITIONS

A. Compliance Schedule

The draft permit includes requirements for the permittee to perform a number of activities designed to increase the facility to its full design capacity and improve facility operations. To ensure the Tulalip Utilities District #1 WWTP has the capability to remain in compliance with the permit, the proposed compliance schedule includes:

- Within one year of the effective date of the permit, the permittee shall remove the sludge in the original oxidation ditch, and shall perform necessary repairs, renovations, painting and sealing to the original oxidation ditch and the two original

secondary clarifiers. The permittee shall return these units to service. The permittee shall submit a report indicating the nature of the repairs and renovations, the dates completed and the date the units have been returned to service to EPA, Office of Water within 14 days of completion of the return to service.

The permittee is required to notify the Director, in writing, of its compliance or noncompliance with compliance schedule requirements and with interim and final effluent loading limitations. If the facility has not been able to comply with the dates of compliance, the permittee must include the reason for noncompliance and a plan for achieving compliance in the written notification to the Director. The notification shall be submitted to the EPA no later than 14 days following each date of compliance.

B. Quality Assurance Plan

Federal regulation 40 CFR § 122.41(e) requires the Permittee to develop and submit a Quality Assurance Plan to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The Permittee is required to submit a Quality Assurance Plan within 120 days of the effective date of the draft permit. The Quality Assurance Plan shall consist of standard operating procedures the Permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The Quality Assurance Plan will also include a plan and schedule that the permittee will implement to re-span the Manning sonic flow meter to 1.2 mgd = 100% within three months, and at least annually thereafter to ensure its proper functionality. A copy of the Quality Assurance Plan is to be maintained on site and be made available to EPA, upon request.

C. Sewage Sludge Management

All of the sewage sludge generated annually at the Tulalip Utilities District #1 Wastewater Treatment Plant is transported to the Metropolitan King County East Section Reclamation Plant at Renton (Metro-Renton Plant) where it is further treated prior to final disposition. Following treatment and dewatering to a Class B standard sludge at the Metro-Renton Plant, 90 percent of the sludge is land applied to cropland in eastern Washington, used in western Washington (King and Pierce Counties) for clearcut forest reclamation, or used for site reclamation in Idaho. During the winter months, approximately 10 percent of the sludge is transferred from the Metro-Renton Plant to a privately owned composting facility (GroCo) in Seattle, Washington. At GroCo the sludge is further treated to meet Class A standards prior to marketing for final beneficial use by landscapers and nurseries. In the event that the Metro-Renton Plant is unable to receive the sludge, the permittee has arranged for the sludge to be transported to the King County Plant in Seattle. The Tulalip Tribes Utilities District is also considering a future disposal option of transfer directly to a composting facility. The draft permit authorizes these options for sewage sludge disposal in accordance with federal and state

regulations and any applicable requirements contained in the operating permits of the land application facilities and composting facility.

To ensure compliance with the Clean Water Act and 40 CFR § 503, the draft permit contains the following requirements:

- General provisions: The permittee must handle and dispose of the sludge in such a way as to protect human health and the environment. In addition, the permittee must comply with all federal and state regulations.

- Suspend delivery for non-compliance: The act of delivering sludge to a recipient facility not in compliance with its sludge permit or with 40 CFR § 503 has a clear potential to aggravate the violation or any potential environmental harm from sludge mismanagement. Therefore, the draft permit requires that the permittee suspend transfer of sludge to any recipient facility that is not in compliance with 40 CFR § 503 or its own permit. In addition, the sludge generator is responsible for establishing contract provisions in order to receive periodic assurance of compliance and/or become aware of problems and/or non-compliance with the provisions of 40 CFR § 503.

- Suspend delivery upon regulatory request: Federal, state, or local regulatory agencies dealing with sludge problems or issues at the Metro-Renton facility must have the ability to mitigate or minimize the extent of those problems, or any adverse environmental effects, by reducing the total amount of sludge entering the facility. Therefore, EPA may require the plant to suspend delivery of sludge upon receipt of a written request from another regulatory facility. If this request is received by either the sludge generator or the recipient, the permittee must deliver a copy of the request to EPA within 12 hours.

The draft permit requires annual monitoring of sludge for the metals required under 40 CFR § 503, Subpart B (arsenic, cadmium, copper, lead, mercury, nickel, selenium, and zinc). These monitoring requirements are based on land application of sludge volumes less than 290 metric tons of sludge per year (dry weight basis). Alternatively, the permittee may substitute the sludge monitoring performed under contract with Metropolitan King County.

The permittee must provide 180 days notice to EPA for any planned changes in sludge management practices. This notification is necessary for the agency to request additional information and to determine if requirements in addition to, or more stringent than, the provisions of 40 CFR § 503 need to be imposed on the new sludge management practice. Such changes in sludge management may be cause for modification, revocation, or reissuance of the permit.

Refer to Appendix D for further details of sludge management dispositioning and requirements.

D. Additional Permit Provisions

Sections II, III, and IV of the draft permit contain "boilerplate" requirements. Boilerplate is standard regulatory language that applies to all Permittees and must be included in NPDES permits. Because they are regulations, they cannot be challenged in the context of an NPDES permit action. The boilerplate covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and general requirements.

VIII. OTHER LEGAL REQUIREMENTS

A. Modification of Permit Limits

EPA may reopen the permit for modification under certain circumstances as specified in federal regulation 40 CFR § 122.62.

B. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species, or those species proposed as threatened or endangered. EPA has determined that issuance of this permit will not likely affect any of the threatened or endangered species in the vicinity of the discharge. EPA will provide USFWS and NMFS with copies of the draft permit and fact sheet during the public notice period. Any comments received from these agencies regarding this determination will be considered prior to reissuance of this permit. See Appendix E for further details.

C. State Certification

Section 401 of the Clean Water Act requires EPA to seek state certification before issuing a final permit. The state may require more stringent permit conditions as a condition of certification to ensure that the permit complies with water quality standards. The state may or may not authorize a *mixing zone* used to calculate effluent limitations. A mixing zone is an allocated impact zone in the receiving water where acute and chronic water quality criteria can be exceeded as long as toxic conditions are prevented and the designated use of the water is not impaired as a result of the mixing zone.

EPA calculated a proposed mixing zone for the Tulalip Utilities District #1 WWTP discharge. The effluent limit calculations for fecal coliform and total residual chlorine are based on a proposed mixing zone defined as a maximum radius of 250 feet in the horizontal direction, centered on the outfall and over the discharge and extending from the marine bottom to the surface. If the state authorizes a different mixing zone in its final certification, the effluent limitations in the final permit will be recalculated based on the dilution available in the final mixing zone. If the state does not certify the mixing zone, EPA will recalculate the permit limitations based on meeting water quality standards at the point of discharge.

D. Coastal Zone Management Act

The State of Washington is conducting a review of the permit to determine consistency with the Coastal Zone Management Act and the Washington Shorelines Management Act. This process began consistent with the public notice of the draft permit.

E. Permit Expiration

This permit will expire five years from the effective date of the permit.

IX. REFERENCES

Cosmopolitan Engineering Group, 1996. *Outfall Evaluation*. February 1996.

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Ecology, 1997. *Guidance for Conducting Mixing Zone Analyses*. Publication No. 97-e12. Prepared by Norm Glenn.

Ecology, 1994. *Permit Writer's Manual, Procedures for Writing Wastewater Discharge Permits*. Water Quality Program, Washington State Department of Ecology, Olympia, WA. July 1994. Publication No. 92-109.

EPA, 1991. *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms*, Third Edition. Washington, D.C. EPA/600-4-91-003.

EPA, 1991. *Technical Support Document for Water Quality-based Toxics Control.* Office of Water Enforcement and Permits, Office of Water Regulations and Standards. Washington, D.C., March 1991. EPA/505/2-90-001.

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Glenn, Norm. 1999. Personal communication between Norm Glenn, Department of Ecology, and Nancy Winters, SAIC. Telephone discussion of mixing zone modeling, input parameters, and use of CORMIX. September 15, 1999.

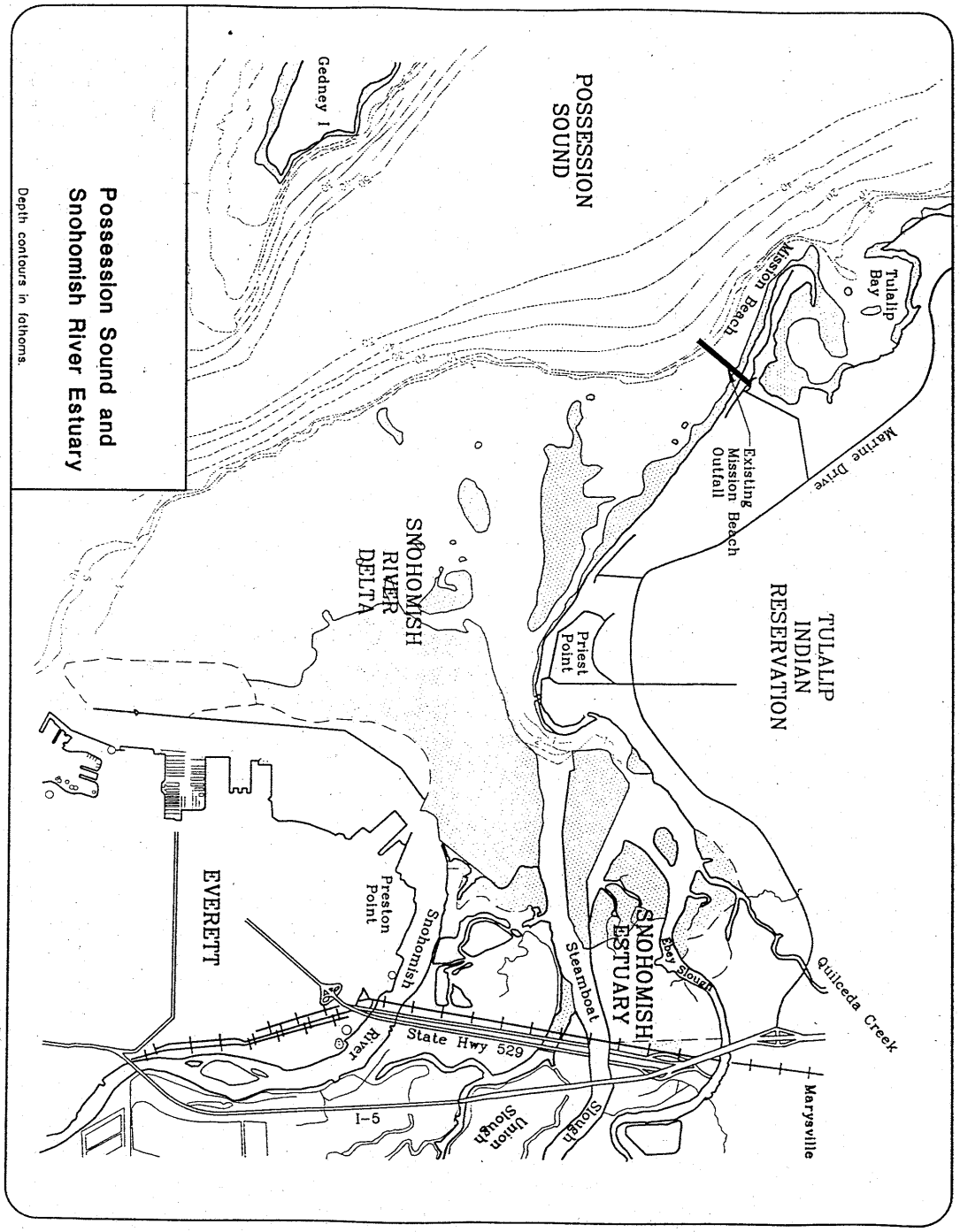
Island Canoe, Inc. 1988. *Puget Sound Current Guide*. Bainbridge Island, Washington.

Jirka, G.H., R.L. Doneker and S.W. Hinton, 1996. *User's Manual for CORMIX: A Mixing Zone Expert System for Pollutant Discharges into Surface Waters.* DeFrees Hydraulics Laboratory, School of Civil and Environmental Engineering, Cornell University, Ithaca NY. Prepared for the U.S. EPA, Office of Science and Technology under Cooperative Agreement No. CX824847-01-0.

Meriwether, Frank, 1997. Washington State Department of Health Inspection Report, letter to Mr. David Ragsdale (EPA) from Mr. Frank Meriwether (DOH), dated November 12, 1997.

Waddle, Robert, D. 1995. *Characterization of Trace Metals in Wastewater Effluents and Ambient Receiving Waters Using "Clean" Sampling Techniques.* Environment Laboratory Solutions, Vol. 2 No. 4.

APPENDIX A - MAP OF OUTFALL LOCATION



APPENDIX B - BASIS FOR DISCHARGE LIMITATIONS

Sections 101, 301(b), 304, 308, 401, 402, and 405 of the Clean Water Act (henceforth referred to as the Act) provide the basis for the effluent limitations and other conditions in the draft permit. EPA evaluates discharges with respect to these sections of the Act and the relevant NPDES regulations in determining which conditions to include in the permit.

In general, EPA first determines which technology-based limits are required to be incorporated into the permit (40 CFR § 122.44(a)), as well as best management practices or other requirements. Technology-based limits for municipal facilities are derived from secondary treatment standards and based on end-of-the-pipe technology. However, the Act requires NPDES permitted discharges to demonstrate compliance with state water quality standards.

Water quality-based limits are derived to protect the water quality of receiving waters. Therefore, the effluent limitations are developed from technology available to treat the pollutants (technology-based limits) and limits that are protective of the designated uses of the receiving water (water quality-based limits). The proposed permit will reflect whichever limits (technology-based or water quality-based) are more stringent. The limits which EPA is proposing in the draft permit are found in Section V of this Fact Sheet and are discussed below.

A. Technology-based Evaluation

The intent of a technology-based effluent limitation is to require a minimum level of treatment for point sources based on currently available treatment technologies while allowing the discharger to use any available control technique to meet the limitations. In 1972, the Act required Publicly Owned Treatment Works (POTWs) to meet performance-based requirements based on available wastewater treatment technology. The Tulalip Utilities District #1 is considered at POTW as defined under 40 CFR 122.2.

Section 301 of the Act established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977. More specifically, section 301(b)(1)(B) of the Act requires that EPA develop secondary treatment standards for POTWs as defined in section 304(d)(1) of the Act. Based on this statutory requirement, EPA developed secondary treatment regulations which are specified in 40 CFR 133. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of BOD_5, TSS, and pH. The basis for the individual effluent limitations is discussed in Section C below.

B. Water Quality-based Evaluation

In addition to the technology-based limits discussed above, EPA evaluated the discharge to determine compliance with Section 301(b)(1)(C) of the CWA. This section requires the

establishment of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to state waters must also comply with limitations imposed by the state as part of its certification of NPDES permits under section 401 of the CWA.

State water quality standards serve the dual purposes of establishing the water quality goals for a specific water body and serve as the regulatory basis for the establishment of water quality-based treatment controls and strategies beyond the technology-based levels of treatment required by Sections 301(b) and 306 of the Act. Furthermore, section 301(b)(1)(C) of the CWA requires the establishment of limitations in permits necessary to meet water quality standards by July 1, 1997.

States, including Indian Tribes, that EPA determines to be eligible for purposes of the water quality standards program, are responsible for reviewing, establishing , and revising water quality standards (40 CFR § 131.4). Additionally, Section 303 of the Act gives the states and tribes authority to develop water quality standards more stringent than required by this regulation. For the discharge of wastewater from the Tulalip facility, Possession Sound is considered state waters; and therefore, the State of Washington water quality standards were applied to this permit.

Federal regulation 40 CFR § 122.44(d)(1) requires that permits include limits for all pollutants or parameters which "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality." The regulations require that this evaluation be made using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and dilution in the receiving water (where appropriate). The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation (WLA).

The regulations also specifically address when toxicity and chemical-specific limits are required. A toxicity limit is required whenever toxicity has the reasonable potential to cause or contribute to an excursion above either a numeric or narrative standard for toxicity. The only exception is where chemical-specific limits will fully achieve the narrative standard. A chemical-specific limit is required whenever an individual pollutant in a facility's discharge is at a level of concern (as defined in 40 CFR § 122.44(d)(1)) relative to the numeric water quality criteria for that pollutant. To support the implementation on EPA's national policy for controlling the discharge of toxicants, EPA developed the *Technical Support Document for Water Quality-Based Toxics Control* (TSD), March 1991, EPA/505/2-90-001. The procedures of the TSD translate water quality criteria or standards to "end-of-the-pipe" effluent limits.

EPA uses the approach outlined below when determining whether water quality-based limits are needed and when developing those limits.

1. Determine the appropriate state adopted criteria.
2. Determine whether there is "reasonable potential" to exceed the criteria.
3. If there is reasonable potential to exceed the criteria, then develop a WLA.
4. Develop effluent limitations, based on WLAs.

The following sections below provide a detailed discussion of these steps.

1. Water Quality Criteria

   The first step in developing water quality-based limits is to determine the applicable water quality criteria. The applicable criteria are determined based on the beneficial uses of the receiving water as identified in Section III of the Fact Sheet. For any given pollutant, different uses may have different criteria. To protect all beneficial uses, the permit limits are based on the most stringent of the water quality criteria applicable to those uses. WAC 173-201A-030(1) of the Washington water quality standards contains the water quality criteria for marine water uses.

2. Reasonable Potential

   To determine if there is *reasonable potential* (RP) to cause or contribute to an excedence of water quality criteria for a given pollutant, EPA compares applicable water quality criteria to the maximum expected receiving water concentrations for a particular pollutant. If the expected receiving water concentration exceeds the criteria, there is RP and a *water quality-based effluent limit* (WQBEL) must be included in the permit.

   In the absence of facility-specific effluent monitoring data to calculate reasonable potential, EPA may decide to develop and impose WQBELs based on qualitative factors. The recommendations contained in Chapter 3 of the *Technical Support Document for Water Quality-based Toxics Control* (TSD, EPA 1991) form the basis used to conduct the RP analysis for the Tulalip Utilities District #1 WWTP. A number of factors were considered based on Section 3.2 of the TSD, including type of facility, existing monitoring data, facility compliance history, and receiving water characteristics. Review of available information, including: Cosmopolitan Engineering Group (February 1996); and Washington State Department of Health Inspection Report (Meriwether, November 12, 1997); and expected pollutant concentrations based on plants of similar use and design, suggests there is reasonable potential for water quality standards to be exceeded for fecal coliform bacteria (FC) and total residual chlorine (TRC).
   Mixing Zone

   Washington water quality standard WAC 173-201A-100 allows a discharge to exceed water quality criteria within a mixing zone authorized by the Washington Department of Ecology (Ecology). The draft permit includes a mixing zone to exceed water quality standards for FC and TRC within the mixing zone. The effluent limits in the draft permit

for FC and TRC are based on a mixing zone radius defined as no more than 200 feet plus the depth of water overlying the discharge pipe in a horizontal direction (centered on the outfall line and over the discharge) and extending from the marine bottom to the surface in accordance with WAC 173-201A-100 for estuarine waters. The mixing zone is based on use of the EPA CORMIX 1 Model. If the State does not authorize a mixing zone in its 401 Certification, the permit limits will be re-calculated to ensure compliance with the water quality standards at the point of discharge.

The input parameters in Table C-1 were used with CORMIX 1 to determine dilution factors. Table C-1 represents the input factors that were used in developing dilution factors for both the interim conditions and the final conditions under the draft permit. Table C-2 provides the flow assumptions for interim and final conditions and the associated dilution factors derived using CORMIX 1 for use with acute and chronic toxic substance criteria. A more detailed discussion of the use of the CORMIX 1 model and sensitivity analyses performed to establish the dilution factors is provided in Attachment 1.

Table C-1: CORMIX Input Parameters

INPUT PARAMETERS	**Chronic**	**Acute**	Rationale
Ambient Parameters			
Average Depth (m)	15.5	15.5	1974 design drawing, depth below MLLW
Depth at Discharge Point (m)	15.5	15.5	1974 design drawings
Tidal Velocity for Run (m/s)	0.1	0.05	0.1 m/s = mean per DOH inspection report 0.05 ~10th %ile std. assump.(N.Glen, Ecology)
Max Tidal Velocity (m/s)	0.3	0.3	From DOH 1996 Inspection Report
Hours After Slack Tide	2	1	Based on above tidal velocities and review of tidal cycle data in CORMIX User's Manual
Manning's n	0.04	0.04	From CORMIX User's Manual for winding channels with pools and shoals

Table C-1: CORMIX Input Parameters			
INPUT PARAMETERS	**Chronic**	**Acute**	Rationale
Density Profile	linear	linear	Based on data for region of interest from State Station PSS-019
Density at Surface (kg/cubic	1015.7	1015.7	Based on '97 winter profiles from PSS-019
Density at Bottom (kg/cubic m)	1022	1022	Based on '97 winter profiles from PSS-019
Discharge Parameters			
Closest Bank	right	right	Map orientation
Distance From Shore (m)	487.7	487.7	Discharge extends ~1600 feet from shore
Vertical Angle of Discharge,	-45	-45	1974 design drawings
Horizontal Angle of Discharge, Sigma (deg)	90	90	Comparison of tide orientation to outfall orientation
Port Diameter (m)	0.3048	0.3048	1974 design drawings
Port Height Above Bottom (m)	0.5	0.5	Assumed allowing for scouring, F. Meriwether
Temperature of Discharge (deg	12.5	12.5	Average facility winter month effluent temp.
Mixing Zone (m)	76.5	7.65	Regulatory boundary
Note: For fecal coliform, a decay rate of 2.4/day was input to the model.			

Table C-2: Effluent Flows for Interim and Final Permit Conditions and Dilution Factors				
	Interim Permit Conditions		**Final Permit Conditions**	
	Chronic	Acute	Chronic	Acute
Effluent flow (cubic m/sec**)**	0.013	0.022	0.027	0.053
Effluent flow (mgd)	0.308[1]	0.508[2]	0.616[3]	1.2[4]
Dilution Factor	77.5	17.5	53.1	1.3

1 Design flow under interim conditions

2 Highest recorded wet-weather flow over past 3 years

3 Design flow under final conditions

4 Maximum daily flow under final conditions

3. Wasteload Allocation Development

Once it has been determined that a water quality-based limit is required for a pollutant, the first step in developing a permit limit is development of a *wasteload allocation* (WLA) for the pollutant. A WLA is the maximum concentration (or loading) of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water.

a. Mixing zone-based WLA

Where the state authorizes a mixing zone for the discharge, the WLA is calculated as a mass balance, based on the available dilution, background concentrations of the pollutant(s), and the water quality criteria. Because the different criteria (acute aquatic life, chronic aquatic life, human health) apply over different time frames and have different mixing zones, it is not possible to compare them directly to determine which criterion results in the most stringent limits. For example, the acute criteria are applied as a one-hour average not to be exceeded more than once every three years on the average and have a smaller mixing zone [not greater than 10 percent of the size of the mixing zone described above and defined in WAC 173-201A-100(7)]. The chronic criteria are applied as a four-day average not to be exceeded more than once every three years on the average and have a larger mixing zone as described above and defined in WAC 173-201A-100(7). The human health criteria are generally based on a 70-year exposure period. To allow for comparison, each criterion is statistically converted to a long-term average (LTA) effluent concentration. The criterion that results in the most stringent LTA concentration is the WLA that is used to calculate the permit limits. In cases where there is only one water quality criterion, the WLA may be directly incorporated into the permit as a maximum daily limit (MDL).

b. "End-of-Pipe" WLA

In some cases, there is no dilution available, either because the receiving water exceeds the criteria or because the State has decided not to authorize a mixing zone for a particular pollutant. When there is no dilution, the criterion becomes the WLA (i.e. limits will apply end-of-pipe). Establishing the criterion as the WLA ensures that the Permittee does not contribute to an exceedance of the water quality standard.

4. Permit Limit Derivation

Once the WLA has been developed, EPA applies the permit limit derivation approach described in Chapter 5 of the TSD to obtain daily maximum and monthly average permit limits.

C. Effluent Limitations

This section contains the derivation of each of the effluent limitations proposed in the NPDES permit for the Tulalip Utilities District #1 WWTP. The limitations are either technology-based, water quality-based, or a combination of technology and water quality-based information.

1. Flow

Interim and final flow limitations have been incorporated into the draft permit based on the design capacity as the plant is currently being operated (308,000 gpd) and the design capacity the plant will realize from the renovation and return to service of the original oxidation ditch and two secondary clarifiers out of service at this time (616,000 gpd).

2. BOD_5 and TSS

An important aspect of domestic wastewater is that it is amenable to biological treatment. This component of a treatment plant is termed "secondary treatment" and is generally subject to a set of performance standards developed by EPA in response to the requirements of the CWA. Federal regulation 40 CFR § 133 establishes a minimum level of effluent quality attainable through secondary treatment in terms of BOD_5, TSS, and pH.

The technology-based effluent limits established for secondary treatment are anticipated to meet the water quality standards in Possession Sound for several reasons. The water quality standards specify a dissolved oxygen concentration of 6.0 mg/l for the Class A marine waters of Possession Sound [WAC-173-201A-030(2)]. Possession Sound is not listed as a water body of impaired water quality for any parameter, including dissolved oxygen. The dilution factors calculated using the CORMIX 1 model indicate dilution factors for the interim and final permit conditions of 77.5 and 53.1, respectively. (See Attachment 1 for discussion of CORMIX model.) With these high dilution factors, degradation of the remaining BOD in the effluent is not anticipated to cause the dissolved oxygen in Possession Sound to be reduced significantly when the discharge reaches the edge of the regulatory mixing zone. Thus, the technology-based standards were applied as effluent limits.

Table C-3 contains the limits for BOD_5 and TSS expressed in both effluent concentration limits and percent removal based on influent loading.

Table C-3: Secondary Treatment Requirements

Parameter	Monthly Average (mg/l)	Weekly Average (mg/l)	Percent Removal
BOD_5	30	45	$\geq$85
TSS	30	45	$\geq$85

In accordance with 40 CFR § 122.45(f), NPDES permits must also express these requirements in terms of mass-based limits. The draft permit establishes interim loading

limits based on the plant design capacity of 0.308 mgd and final loading limits based on the plant design capacity of 0.161 mgd (40 CFR § 122.45(b)). The limits are calculated by multiplying the concentration limits by the design flow and a conversion factor of 8.34 (pounds)(liters)/(milligrams)(million gallons) as shown below:

Interim Effluent Loading:

Monthly Average Load = (0.308 mgd)(30 mg/L)(8.34) = 77 lbs/day

Weekly Average Load = (0.308 mgd)(45 mg/L)(8.34) = 116 lbs/day

Final Effluent Loading:

Monthly Average Load = (0.616 mgd)(30 mg/L)(8.34) = 154 lbs/day

Weekly Average Load = (0.616 mgd)(45 mg/L)(8.34) = 231 lbs/day

3. pH

In addition to limits on BOD_5 and TSS, 40 CFR § 133.102 specifies a pH range from 6.0 to 9.0 standard units for secondary treatment plants. The Washington water quality standards (WAC 173-201A-030) require that ambient pH be in the range of 7.0 - 8.5 standard units for marine waters including Possession Sound. The waters of Puget Sound provide sufficient buffering capacity to ensure that the ambient pH range will not be exceeded by applying the technology-based discharge limit to either the interim or final flow. Therefore the draft permit incorporates the technology-based effluent limit of 6.0 - 9.0 standard units.

4. Fecal Coliform Bacteria

Federal regulations do not include technology-based limits for fecal coliform. However, the existing permit contains the limits of 200 FC/100 ml for a thirty-day average and 400 FC/100 ml for a seven-day (weekly) average.

The Washington water quality standards contain requirements for fecal coliform that could be considerably more stringent than the effluent limitations established in the previous permit. WAC 1730201A-140 designates Possession Sound as a Class A water body. As a result, the more stringent of these criteria and the existing permit conditions must be incorporated into the permit. For Class A estuarine water, WAC 173-201A-030 requires that the fecal coliform (FC) not exceed a geometric mean value of 14 colonies/100 ml, and not more than 10% of all samples obtained for the geometric mean may exceed a value of 43 colonies/100 ml. These criteria apply at the edge of the regulatory mixing zone (in this case, where the effluent plume intersects the edge of the 251-foot radius cylinder).

After determining the applicable water quality criterion, the next step in establishing water quality-based permit limitations is to calculate a wasteload allocation (WLA) for the pollutant. The ambient fecal coliform concentration in this case is assumed to be zero, thus reducing the WLA calculation to the product of the water quality criterion and the dilution factor. A dilution factor of 77.5:1 was used for the interim limits and a dilution factor of 53.1:1 was used for the final limits based on the output of the EPA CORMIX 1 Model for assessing receiving water characteristics. The Washington water quality standards do not contain separate criteria for acute and chronic effects, thus eliminating the need to calculate separate long term averages. As such, the WLA is evaluated as the *maximum daily limit* (MDL). The thirty-day average, or *average monthly limit* (AML), is derived by simply dividing the MDL by a factor of 2.0. This calculation is referred to in Chapter 5 of the TSD as follows:

Interim Conditions:

Interim WLA = water quality criterion C interim dilution factor where:

water quality criterion = 14 FC/100ml
interim dilution factor = 77.5

Interim WLA = MDL = 14 FC/100ml C 77.5 = 1085 FC/100ml

AML = (1085 FC/100ml)/2 = 542.5 FC/100ml

Final Conditions:

Final WLA = water quality criterion C final dilution factor where:

water quality criterion = 14 FC/100ml
final dilution factor = 53.1

Final WLA = MDL = 14 FC/100ml C 53.1 = 743 FC/100ml

AML = (743 FC/100ml)/2 = 372 FC/100ml

The available dilution from the 251-foot radius mixing zone in Possession Sound would allow effluent fecal coliform concentrations that are significantly less stringent than those in the existing permit. The anti-backsliding provisions of the Clean Water Act prohibit the application of less stringent permit limits in subsequent permits. Thus, the limits in the existing permit of 200 colonies/100 ml as the monthly average limitation and 400 colonies/100 ml as the weekly average limitation are incorporated into the draft permit as both interim and final limits. Receiving waters outside of the mixing zone will be protected by these limitations and will meet the applicable state water quality standards referenced above. If the State does not authorize a mixing

zone in its Clean Water Act Section 401 Certification, the permit limits will be re-calculated to ensure compliance with the water quality standards at the point of discharge.

5. Total Residual Chlorine

Gaseous chlorine is added to the final effluent as a means of disinfection prior to discharge. As a result, effluent may contain residual chlorine compounds that can be toxic to aquatic life. The existing permit does not contain a limitation for total residual chlorine (TRC). However, the Washington water quality standard for protection of aquatic life requires that TRC concentrations not exceed 13.0 µg/l at the edge of the acute regulatory boundary, nor 7.5 µg/l at the edge of the chronic regulatory boundary (mixing zone). The acute regulatory boundary is not greater than 10 percent of the mixing zone; it is a volume in which the acute criterion concentration averaged over one hour shall not be exceeded more than once every three years on the average. The chronic regulatory boundary is defined as the mixing zone (251-foot radius); it is a volume in which the chronic criterion concentration averaged over a 4-day period shall not be exceeded more than once every three years on the average. Interim effluent limitations have been derived on performance-based standards as described in the TSD. Final effluent limitations for TRC have been derived based on the water quality-based methodology in Chapter 5 of the TSD and incorporated into the draft permit. Performance-based calculations of the interim effluent limitations are shown below. Calculations of the final effluent limitations using acute and chronic dilution factors of 1.3:1 and 53.1:1, respectively are also described below.

Interim TRC Limits

Interim average monthly limits and maximum daily limits are not established on the basis of the water quality criteria for total residual chlorine, because no dechlorination process is currently in place. To meet water quality-based limits a dechlorination unit would be required. Until installation of dechlorination equipment (one year after the permit issuance) is complete, interim average monthly limits (AML) and maximum daily limits (MDL) are established using the performance-based methods specified in the TSD and described below.

Approximately three years of daily final effluent residual chlorine data were used to calculate performance-based limits using a logarithmic transformation of the daily data points (x), y = ln (x) as follows:

$F_y = \Sigma(y_i)/k$ and

$F_y^2 = \Sigma(y_i - F)^2/(k-1)$ where:

$y_i = \ln (x_i)$ for i = 1, 2, ...k (in this case, k = 1092)

The performance-based 99th percentile Maximum Daily Limt (MDL) = exp [σ_y + 2.326 σ_y]

The Interim MDL for total residual chlorine = 0.87 mg/l

To calculate the monthly average limit, the following relationships are required:

E(x) = daily average = exp (σ_y + $\sigma_y^2/2$)

V(x) = exp ($2\sigma_y + \sigma_y^2$) [exp(σ_y^2) - 1]

$\sigma_n^2 = \ln\{V(x)/[n[E(x)]2 + 1\}$

σ_n = n-day, 30 day in this case, monthly average = $\ln(E(x)) - 0.5\sigma_n^2$

The performace-based 95th percentile 30-day Average Monthly Limit is (AML) = exp[σ_n + 1.645 σ_n]

The Interim AML for total residual chlorine = 0.31 mg/l

Final TRC Limits

The water quality calculations for the final TRC effluent limitations using an average monthly flow equal to the design flow of 0.616 mgd and a maximum daily flow of 1.2 mgd, the acute and chronic dilution factors are 1.3 and 53.1, respectively.

WLA_a = acute water quality criterion C acute dilution factor where:

acute water quality criterion = 13.0 µg/l
acute dilution factor = 1.3

WLA_a = 13.0 µg/l C 1.3 = 16.9 µg/l (or 0.017 mg/l)

WLA_c = chronic water quality criterion C chronic dilution factor where:

chronic water quality criterion = 7.5 µg/l
chronic dilution factor = 53.1

WLA_c = 7.5 µg/l C 53.1 = 398 µg/l (or 0.398 mg/l)

A long-term average (LTA) is calculated for each scenario. To ensure that neither the acute nor the chronic criteria are exceeded, the more stringent of LTA_a and LTA_c is selected.

$LTA_a = WLA_a \exp(0.5\sigma^2 - z\sigma)$ where:

$\sigma^2 = \ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability
CV = Coefficient of variation (assumed 0.6, per TSD, page 107)

LTA_a = 0.0054 mg/l

$LTA_c = WLA_c \exp(0.5\sigma_4^2 - z\sigma_4)$ where:

$\sigma_4^2 = \ln(CV^2/4 + 1)$
z = 2.326 for 99th percentile probability
CV = Coefficient of variation (assumed to be 0.6)

LTA_c = 0.210 mg/l

Selecting the more restrictive of the two: **LTA_a = 0.0054 mg/l = LTA**

Maximum Daily Limit (MDL) = LTA $\exp(z\sigma - 0.5\sigma^2)$ where:

$\sigma^2 = \ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability
CV = Coefficient of variation, CV = 0.6 (assumed)

Final MDL for total residual chlorine would be = 0.017 mg/l

Average Monthly Limit (AML) = LTA $\exp(z\sigma_n - 0.5\sigma_n^2)$ where:

$\sigma_n^2 = \ln(CV^2/n + 1)$
z = 1.645 for 95th percentile probability
CV = Coefficient of variation, CV = 0.6 (assumed)
n = 30 (number of samples)

Final AML for total residual chlorine = 0.006 mg/l.

The analytical method used by the permittee to measure total residual chlorine must be an EPA approved method in accordance with 40 CFR § 136 and achieve a *minimum level* of 100 µg/l (0.10 mg/l). The *minimum level* is defined as the concentration at which the entire analytical system gives recognizable signals and an acceptable calibration point. The interim AML, final MDL, and final AML for chlorine are less than the *minimum level* of 0.10 mg/l, and as such, the permittee will

need to ensure the laboratory performing the analyses can meet the minimum level. The permittee will be considered in compliance with the total residual chlorine effluent limits provided the calculated monthly average total chlorine residual is at or below the minimum level of 0.10 mg/L.

Receiving waters outside of the mixing zone must meet the applicable state water quality standards referenced above. If the State does not authorize a mixing zone in its 401 Certification, the permit limits will be re-calculated to ensure compliance with the water quality standards at the point of discharge.

6. Floating, Suspended or Submerged Matter

Water quality standards state that the discharge must be free of floating solids, visible foam, or oily wastes which produce a sheen on the surface of the receiving water This condition has been retained in the draft permit.

D. Monitoring Requirements

Monitoring requirements have been established in the draft permit based on the requirements contained in 40 CFR § 122 and the *TSD* (EPA, 1991). A number of factors were considered in determining the specific requirements, including effluent and process variability, effect of flow and pollutant load on the receiving water, characteristics of pollutants discharged, permittee compliance history, and a comparison of monitoring requirements for facilities of similar size and design.

In addition to routine effluent monitoring, the draft permit requires semi-annual monitoring of three metals (copper, mercury, and silver) for five years. These metals were identified in the *Outfall Evaluation* report (Cosmopolitian Engineering Group, 1996) as potentially requiring water quality-based effluent limitations to meet Washington's water quality standards. To evaluate the need for water quality-based effluent limitations for these three metals, data on the concentrations of these metals in the effluent are needed. The water quality criteria for these metals approach or are below analytical detection limits. Historic sampling for these parameters in natural waters in the vicinity of the Tulalip indicates low concentrations. Therefore, specific "clean" sampling protocols are required in the draft permit. Use of these protocols should eliminate a regulatory response to elevated data that may not represent actual concentrations. The data from the metals analyses will be used to assist in development of effluent limitations for permit re-issuance in five years.

APPENDIX C - SLUDGE MANAGEMENT

The sludge management regulations of 40 CFR § 503 were designed so that the standards are directly enforceable against most users or disposers of sewage sludge, whether or not they obtain a permit. Therefore, the publication of § 503 in the *Federal Register* on February 19, 1993 served as notice to the regulated community of its duty to comply with the requirements of the rule, except those requirements that indicate that the permitting authority shall specify what has to be done.

Though § 503 is largely self-implementing, Section 405(f) of the CWA requires the inclusion of sewage sludge use or disposal requirements in any NPDES permit issued to a Treatment Works Treating Domestic Sewage. In addition, the sludge permitting regulations defined in 40 CFR Sections 122 and 124 have been revised to expand its authority to issue NPDES permits with these requirements. This includes all sewage sludge generators, sewage sludge treaters and blenders, surface disposal sites and sewage sludge incinerators. The requirements of 40 CFR § 503 must be met when sewage sludge is applied to the land, treated and used as compost, placed on a surface disposal site, placed on a municipal solid waste landfill (MSWLF) unit, or fired in a sewage sludge incinerator.

40 CFR § 503 contains provisions relating to pollutants in sewage sludge, the reduction of pathogens in sewage sludge, the reduction of the characteristics in sewage sludge that attract vectors, the quality of sewage sludge that is land applied, the sites where sewage sludge is either land applied or placed for final disposal, and sewage sludge incinerators.

To ensure compliance with the CWA and the federal standards contained in 40 CFR § 503 for the use or disposal of biosolids, the draft permit contains the following requirements:

A. State Laws and Future Federal Standards: Pursuant to 40 CFR § 122.41(a), a condition has been incorporated into the draft permit requiring the Permittee to comply with all existing federal and state laws, and all regulations applying to biosolids use and disposal. These standards shall be interpreted using the draft permit and the specific EPA guidance documents listed below. These documents are used by EPA Region 10 as the primary technical references for both permitting and enforcement activities: *Part 503 Implementation Guidance*, EPA 833-R-95-001, and *Environmental Regulations and Technology: Control of Pathogens and Vector Attraction in Sewage Sludge*, EPA/625/R-92/013.

B. Health and Environment General Requirement: The CWA requires that the environment and public health be protected from toxic effects of any pollutants in biosolids. Therefore, the Permittee must handle and use/dispose of biosolids in such a way as to protect human health and the environment. Under this requirement the permittee is responsible for being aware of all pollutants allowed to accumulate in the sludge, and for preventing harm to the public from those pollutants. EPA has published the following guidance document to help facilities evaluate potential nutrient and micronutrient problems: *A Guide to the Biosolids Risk Assessment for the EPA Part 503 Rule*, EPA 832-B-93-005.

C. Sludge Use and Disposal Practices: Sludge from the Tulalip Utilities District #1 WWTP is pumped from a sludge aeration basin where it undergoes digestion and polymer conditioning to a transport truck. The transport vehicle transfers the sludge to the sludge and septage receiving station at the Metropolitan King County East Section Reclamation Plant at Renton (Metro-Renton). There the sludge is aerated and chlorinated (to reduce odors) prior to discharge into the 120-inch sewer main entering the Metro-Renton wastewater treatment facility. Following full secondary treatment, the sludge is dewatered and treated to meet Class B standards prior to shipment. Approximately 90 percent of the sludge is used as a soil amendment (land applied) for grains (generally wheat, barley, and hops), grapes, and rangeland in eastern Washington, for clearcut reclamation projects in King County Washington, or for Superfund site reclamation in Couer d'Alene, Idaho. All land application projects in Washington are permitted by the Department of Ecology. The site reclamation project in Idaho has been approved by EPA. During the winter months, approximately 10 percent of the sludge is shipped to a private composting facility in Kent, Washington (Sawdust Supply), where sawdust is mixed with the sludge in a ratio of 3:1 and held for the necessary period of time and at the required temperatures to meet the Class A standards. The compost is then marketed to landscapers and nurseries under the name of GrowCo.

In the event that the Metro-Renton Plant cannot accept the sludge from the Tulalip Tribes Utilities District #1 WWTP, the Utility District has made arrangements to have the sludge transported to the King County Plant in Seattle, Washington. The Tulalip Utilities District #1 is also considering an option to transfer sludge directly to a composting facility for subsequent treatment and beneficial use.

The transfers of sludge to: the Metro-Renton Plant or other facility, its subsequent treatment and transfer to land application projects and the composting facility, or directly to a composting facility discussed above are authorized in the draft permit as options for sludge disposal provided these facilities are operating in compliance with a current permit from the appropriate regulatory authority. The Permittee is required to suspend the transfer of sludge to any recipient facility that is not in full compliance with 40 CFR § 503 or its own permit.

D. Sludge Monitoring: The permittee is responsible for ensuring that sludge quality is in compliance with the disposal requirements of the draft permit and any current or future operating permits of the sludge receiving facility. Once each year, the permittee will be required to collect and analyze samples of sludge transferred to the Metro-Renton facility. Metro-Renton also requires that the sludge has been characterized as meeting the applicable quality criteria for the their facility and sludge quality is consistent from batch to batch.

APPENDIX D - ENDANGERED SPECIES ACT

The Endangered Species Act (ESA) allocates authority to and administers requirements upon federal agencies regarding endangered and threatened species of fish, wildlife, and plants and habitat of such species that has been designated as critical. Federal regulations contained in 50 CFR § 402 require EPA to ensure, in consultation with the Secretary of the Interior or Commerce, that any action authorized, funded, or carried out by EPA is not likely to jeopardize the continued existence of any endangered or threatened species or adversely affect critical habitat.

In accordance with Section 7 of the Endangered Species Act, a list of endangered and threatened species and other species of concern which may occur in the project area was provided to EPA by the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS). In a letter dated October 5, 1999, the NMFS identified the following federally-listed species in the area of discharge:

Common Name	Scientific Name	ESA Status
Puget Sound chinook salmon	*Oncorhynchus tshawytscha*	threatened
Coho salmon	*Oncorhynchus kisutch*	candidate
Stellar sea lion	*Eumetopias jubatus*	threatened
Humpback whale	*Megatera novaengliae*	endangered
Leatherback sea turtle	*Dermocheyls coriacea*	endangered

In a letter dated October 13, 1999, the USFWS identified the following federally-listed species in the area of discharge:

Common Name	Scientific Name	ESA Status
Bald eagle	*Haliaeetus leucocephalus*	threatened
Bull trout	*Salvelinus confluentus*	proposed

EPA is conducting informal consultation with NMFS and USFWS to ensure that the effluent conditions contained in the final permit are protective of any federally-listed species that may occur in the project area.

Attachment 1
CORMIX Modeling Discussion

1. Introduction

The CORMIX Model (Version 3.2, September 1996) was used to estimate dilution factors for determining interim and final permit limits for the Tulalip Utilities District #1 WWTP's NPDES permit. CORMIX is appropriate for this type of application as it can take into account non-steady-state receiving water bodies with non-uniform density profiles such as found in the tidal estuary in the vicinity of the site outfall. In addition, CORMIX has been used by the State of Washington, Department of Health (DOH) (Meriwether, 1997), to establish the extent of a shellfish closure zone around the outfall.

2. CORMIX Input Data

The CORMIX 1 model subsystem for submerged single port discharges was used for the modeling runs along with the input parameters presented in Tables 1 and 2. Based on 1974 design drawings, the sewage treatment plant outfall ends approximately 1600 feet offshore at a depth of 51 feet mean lower low water (MLLW). The outfall is directed downward (at approximately 45 degrees from horizontal) and to the southwest (at an average of 90 degrees to the flood or ebb tides), based on the design drawings and a comparison of the outfall orientation with the tide orientation as depicted in the Puget Sound Current Guide (Island Canoe, Inc., 1988). The outfall effluent temperature of 12.5 degrees Celsius was determined from facility data based on a 3-year average temperature for winter months.

Table 1. CORMIX Input Parameters

INPUT PARAMETERS	Chronic	Acute	Rationale
Ambient Parameters			
Average Depth (m)	15.5	15.5	1974 design drawing, depth below MLLW
Depth at Discharge Point (m)	15.5	15.5	1974 design drawings
Tidal Velocity for Run (m/s)	0.1	0.05	0.1 m/s = mean per DOH inspection report 0.05 ~10^{th} %ile std. assump.(N.Glen, Ecology)
Max Tidal Velocity (m/s)	0.3	0.3	From DOH 1996 Inspection Report
Hours After Slack Tide	2	1	Based on above tidal velocities and review of tidal cycle data in CORMIX User's Manual
Manning's n	0.04	0.04	From CORMIX User's Manual for winding channels with pools and shoals

Table 1. CORMIX Input Parameters			
INPUT PARAMETERS	**Chronic**	**Acute**	Rationale
Density Profile	linear	linear	Based on data for region of interest from State Station PSS-019
Density at Surface (kg/cubic	1015.7	1015.7	Based on '97 winter profiles from PSS-019
Density at Bottom (kg/cubic m)	1022	1022	Based on '97 winter profiles from PSS-019
Discharge Parameters			
Closest Bank	right	right	Map orientation
Distance From Shore (m)	487.7	487.7	Discharge extends ~1600 feet from shore
Vertical Angle of Discharge,	-45	-45	1974 design drawings
Horizontal Angle of Discharge, Sigma (deg)	90	90	Comparison of tide orientation to outfall orientation
Port Diameter (m)	0.3048	0.3048	1974 design drawings
Port Height Above Bottom (m)	0.5	0.5	Assumed allowing for scouring, F. Meriwether
Temperature of Discharge (deg	12.5	12.5	Average facility winter month effluent temp.
Mixing Zone (m)	76.5	7.65	Regulatory boundary
Note: For fecal coliform, a decay rate of 2.4/day was input to the model.			

Table 2 lists effluent flows used for the various modeling runs and provides the rationale for the selected flow regimes used in the model.

Table 2. Modeled Effluent Flows for Interim and Final Permit Conditions and Dilution Factors				
	Interim Permit Conditions		**Final Permit Conditions**	
	Chronic	Acute	Chronic	Acute
Effluent flow (cubic m/sec**)**	0.013	0.022	0.027	0.053
Effluent flow (mgd)	0.308[1]	0.508[2]	0.616[3]	1.2[4]
Dilution Factor	77.5	17.5	53.1	1.3

Notes: 1 Design flow under interim conditions

2 Highest recorded wet-weather flow over past 3 years

3 Design flow under final conditions

4 Maximum daily flow under final conditions

Maximum (0.3 meters/sec) and average (0.1 meters/sec) tidal velocities were based on information in the DOH report for the establishment of the shellfish closure zone. Minimum (10^{th} percentile) tidal velocity (0.05 meters/sec) was provided as an estimate in the range of 0.04 to 0.05 meters/sec by Washington State Department of Ecology water quality modelers (Glenn, pers. comm.). The minimum tidal velocity was used for determining dilution factors for the acute mixing zone; the average tidal velocity was used for determining dilution factors for the chronic mixing zone, as

required by the Department of Ecology's "Guidance for Conducting Mixing Zone Analyses." The model uses the maximum tidal velocity to calculate a rate of tidal reversal. A default period of tidal reversal of 12.4 hours was used in the modeling as suggested in the CORMIX User's Manual (Jirka, et al., 1996).

The density profile for the estuary in the vicinity of the discharge was based on 1997 data from Department of Ecology Monitoring Station PSS-019. Based on the profile for winter months, the density profile to a depth of 51 feet was determined to be approximately linear with an average density of 1015.7 kg/m^3 at the surface and 1022 kg/m^3 at 51 feet.

Chronic and acute mixing zones were calculated as 76.5 meters and 24.2 meters, respectively, based on the regulatory boundaries established in WAC 173-201A-100.

3. Sensitivity Analysis Simulations

A number of model runs were performed to test the sensitivity of the CORMIX 1 model to certain input parameters such as average ambient depth, density profile, bounded versus unbounded cross-sections, and tidal versus steady-state ambient water conditions. Final input parameters listed in Table 1 are based on the sensitivity runs that are discussed below.

3.1 Estuary Depth

The estuary depth in the vicinity of the discharge is approximately 51 feet but varies from quite shallow with sandbars to the southeast, to as deep as 300 feet further west in Possession Sound. Runs were performed for average depth (HA) = depth at discharge (HD), HA<HD, and HA>HD. The CORMIX model only allows a difference of plus or minus 30% between HA and HD, therefore, the choice of HA was constrained by these limits. The run with HA=HD produced slightly lower dilution factors (more conservative) than for HA>HD. The run with HA<HD produced the lowest dilution factors due to some upstream spreading of the effluent, but the model output recommended setting HA=HD in subsequent runs, due to discontinuities in the modeling regime. Therefore, HA=HD was chosen for all subsequent model runs. Setting HA=HD is also the most representative scenario for the region of interest (i.e., the distances to the edge of the mixing zones are very small compared to the distance to deep or shallow areas.

3.2 Density Profiles

Three different density profiles can be simulated in CORMIX identified as Types: A) a linear profile, B) a two-layer system with constant densities and a density jump, and C) a constant density surface layer with a linear density profile in the bottom layer, separated by a density jump. Modeling runs were performed for all three cases. Type A and Type C profiles resulted in slightly lower dilution factors than Type B. The linear profile, Type A, was selected for use because it is the most accurate representation for the vertical layer of interest (i.e., 51 feet MLLW) based on data from monitoring station PSS-019.

3.3 Bounded and Unbounded Estuary

Modeling runs were performed for both a bounded and unbounded estuary cross-section. The results showed that there is no difference in dillution factors or the extent of the effluent plume. Therefore, an unbounded cross-section was assumed, because the distance to a plume impingement on an opposite shore or estuary island is much greater that the regulatorily established boundaries and the impacts of the plume on opposite shores would be insignificant.

3.4 Steady-State and Tidal Representations

The final set of sensitivity runs compared a steady-state representation of the receiving water body with a tidal representation. Steady-state runs were performed for both the low tidal (10^{th} percentile) velocity (0.05 meters/sec) and for the average tidal velocity (0.1 meters/sec). The steady-state runs were compared to tidal representations for these same velocities. For a tidal velocity of 0.1 meters/sec, dilution factors predicted for the tidal run in the vicinity of the mixing zone were approximately 1.5 times lower than the steady-state run; the predictions terminated after the tide reversed. For the tidal velocity of 0.05 meters/sec, dilution factors were similar in both the steady-state and tidal scenarios; the critical factor seemed to be the low receiving water velocity. The tidal simulations were selected for use in the CORMIX model because they were most representative for the water body and because these simulations produced lower dilution factors (more conservative) results for the average tidal velocity (chronic mixing zone) runs.

The CORMIX user must also enter a time relevant to slack tide for which the tidal velocities apply. Values for the times were selected based on a review of tidal cycle data curves from the CORMIX User's Manual (Jirka, et al., 1996). The low tidal velocity was modeled at 0.5 and 1.0 hour after slack tide. The average tidal velocity was modeled at 1.5, 2.0, and 2.5 hours after slack tide. The model results showed little sensitivity to time variations, therefore, one hour after slack tide was selected for the low tidal velocity, and 2 hours was selected for the average current velocity.

4. Summary of Results

The sensitivity runs and the final modeling runs were used to determine the dilution factors that are presented in Table 2. These dilution factors were used to calculate both interim and final permit limits as previously described in Attachment C.